

Section 910. GEOSYNTHETICS

910.01 General Requirements. Geosynthetics shall be composed of long-chain synthetic fibers of at least 85 percent by weight polyolefins or polyesters, and shall be resistant to chemical attack, mildew, rot, and ultraviolet light.

Geosynthetics shall be delivered and stored in packaging which is resistant to ultraviolet radiation, contaminants, and moisture. Each unit of material shall be labeled with sufficient product information to allow for supplier and lot identification. Geosynthetics shall not be exposed to direct sunlight for prolonged periods. Damaged geosynthetics shall be repaired or replaced at no additional cost to the Department.

910.02 Testing. Testing of geosynthetics shall be according to applicable ASTM standard test methods unless otherwise noted. The physical property requirements for geotextiles are listed in Table 910-1. Specified values are minimum values. Values which represent directional properties are specified for the weaker principle direction.

910.03 Geotextiles. Geotextiles shall be flexible, permeable fabrics consisting of synthetic fibers or yarns oriented into a dimensionally stable network. Woven geotextiles shall have sealed or selvaged edges to prevent raveling.

- A. **Geotextile Blanket.** Geotextile blanket is designed for filtration applications, including trench lining, ditch lining, streambed protection, pipe wrap, joint wrap, drainhole and weephole filter, granular blanket separation, and filter bags. Geotextile blanket shall be a non-woven geotextile meeting the requirements in Table 910-1.
- B. **Geotextile Liner.** Designed for erosion control in riprap and similar applications, geotextile liner shall be non-woven and meet the requirements in Table 910-1. When heavy riprap is specified, the non-woven geotextile shall meet the strength requirements in Table 910-1.
- C. **Geotextile Separator.** Geotextile separator is designed to prevent intermixing of dissimilar aggregate or soil layers, such as subbase material and drainage course aggregate. Geotextiles with grab tensile elongation-at-break less than 50 percent shall meet the requirements in Table 910-1 for woven geotextiles. Geotextiles with grab tensile elongation-at-break equal to or greater than 50 percent shall meet the strength requirements in Table 910-1 for non-woven geotextiles.
- D. **Stabilization Geotextile.** Designed to prevent intermixing of soft subgrade and subbase materials (subgrade stabilization), stabilization geotextile shall meet the requirements in Table 910-1.

910.04 Silt Fence Geotextile. Geotextile used to fabricate silt fence shall be selected from the Qualified Products List. Designed to collect eroded sediment transported in stormwater runoff, silt fence geotextile shall meet the requirements in Table 910-1 and have a nominal height of three feet. The geotextile shall have 70 percent minimum retained strength after 500 hours of U.V. exposure when tested according to ASTM D 4355. Silt fence shall be fabricated according to subsection 916.02.

910.05 Drainage Geocomposites. Prefabricated geocomposites for drainage applications shall consist of a geotextile bonded to or wrapped around a polymer core having corrugated, dimpled, tubular, or net (mesh) configurations. Geocomposites shall have sufficient flexibility and durability to withstand installation, handling, and permanent loading stresses.

All fittings used in geocomposite installations shall meet the published specifications of, or be manufactured by the geocomposite manufacturer. Tape used in sealing ends, joints, and fittings shall be designed for underground service conditions using waterproof adhesives.

All components of the geocomposite system shall be approved by the Engineer prior to installation.

- A. **Prefabricated Drainage System (PDS).** Designed for underdrain applications; PDS shall consist of a polymer core wrapped completely with geotextile. The geotextile shall be stretched tightly around the core and bonded to itself and/or to the core, having a minimum peel strength of 35 pounds per foot per ASTM D 1876. The core shall have one inch minimum thickness and shall allow transverse flow from both directions. The geocomposite shall have a minimum crush strength of 6000 psf at no more than 18 percent deformation when tested according to MTM 411.
- B. **Wall Drain.** The polymer core shall be impermeable, for single-direction cross-planar flow, with geotextile bonded to one side. The geocomposite shall have a minimum crush strength of 4000 psf at no more than 18 percent deformation when tested according to MTM 411.
- C. **Geocomposite Net.** An alternate to open-graded aggregate drainage layer, the geocomposite net (mesh) will be approved by the Engineer based upon durability, drainage capacity, crush resistance, tensile strength, and thickness. Geotextile blanket shall be bonded to both sides of the mesh.

Table 910-1 Physical Requirements for Geotextiles

PROPERTY/ TEST METHOD GEOTEXTILE CATEGORY	Grab Tensile Strength (min) ASTM D 4632 lbs	Trapezoid Tear Strength (min) ASTM D 4533 lbs	Puncture Strength (min) ASTM D 4833 lbs	Mullen Burst Strength (min) ASTM D 3786 psi (a)	Permittivity ASTM D 4491 per second	Apparent Opening Size (max) ASTM D 4751 (b) millimeters
GEOTEXTILE BLANKET (c)	90	45	45	140	0.5	0.21
GEOTEXTILE LINER	200	75	75	200	0.5	0.21
GEOTEXTILE LINER Heavy	270	100	100	400	0.5	0.21
GEOTEXTILE SEPARATOR Woven (<50% elongation)	270	100	100	400	0.05	0.21
GEOTEXTILE SEPARATOR NonWoven (>50% elongation)	200	75	75	200	0.05	0.21
STABILIZATION GEOTEXTILE	270	100	100	400	0.05	0.50
SILT FENCE	100 (d)	45	--	--	0.1	0.60
DRAINAGE GEOCOMPOSITES (e)	90	45	65 (e)	200 (e)	0.5	0.21

a. ASTM D 3786-87. The fluid displacement rate for the Mullen burst test equipment must be 170 ± 5 ml/minute. Subtract tare strength from the ultimate burst strength as specified by ASTM.

b. Filtration opening size (FOS, Canadian General Standards Board, method 148.1 No. 10) is permitted as an alternate test method to ASTM D 4751 for non-woven geotextiles.

c. For pipe wrap where backfill around the pipe meets granular material Class II requirements; geotextiles, including knitted polyester sock, which meet the following minimum requirements in the applied condition are permitted: Mass/Unit Area - 3.0 oz/yd²; Mullen burst strength -100 psi; maximum apparent opening size must be 0.30 mm for pavement and foundation underdrains, and 0.60 mm in other areas.

d. Elongation at the specified grab tensile strength not to exceed 40% for silt fence.

e. Geotextile placed over a continuous tubular core must have 100 psi minimum Mullen burst strength and 40 pounds minimum puncture strength.